THE ROYAL SOCIETY CONVERSAZIONE.

THE rooms of the Royal Society were crowded with a distinguished gathering on Wednesday evening, the 13th inst., the occasion being the annual Ladies' Conversazione of the Society. In accordance with our usual custom, we give descriptions of the most important exhibits not previously mentioned in these columns.

Prof. McKenny Hughes, F.R.S., exhibited specimens illustrating the evolution of the breeds of English oxen. The earliest breed, *Bison priscus*, belongs exclusively to the Palæolithic age. The next, *Bos primigenius*, commenced with *Bison priscus*, but outlived that species, and is characteristic of the Neolithic age. Both the above forms had disappeared before the arrival of the Romans in Britain. *Bos longifrons* appeared with *Bos primigenius*, but survived to Roman times. The Romans improved *Bos longifrons* by crossing it with some larger breed having straighter and more upturned horns. As there was no large native breed surviving, and, moreover, the characters of *Bos primigenius* do not appear in the cross, the Romans must have imported the breed with which *Bos longifrons* was crossed. The type of the Roman breed is still seen in the tawny Highland cattle (a larger variety of which is still common in Italy); in the black Welsh and Highland (such as were killed for funeral feasts); and in the Chillingham cattle (the descendants of the white sacrificial bull). All these are whole-coloured; the parti-coloured cattle are a much later introduction. After the withdrawal of the legionaries, there was soon no end of selection of stock, and the cattle, except those preserved in enclosures or isolated in the far West and North, reverted to the type of *Bos longifrons* as seen in specimens from the mediæval ditches round Cambridge.

Mr. Shelford Bidwell, F.R.S., exhibited illustrations of recurrent vision and retinal oscillations. For recurrent vision a moving patch of light, white or coloured, projected upon a screen, was followed at a short distance by a "ghost" or recurrent image, generally of a violet hue. To show retinal oscillations a modified form of Charpentier's experiment was used, demonstrating the brief period of insensibility to luminous impressions which follows the impact of light upon the eye.

The shell musical instruments (trumpets and flutes), exhibited by Dr. George Harley, F.R.S., included: (1) Shell fog-horn used by fishermen on the banks of Newfoundland (*Strombus gigas*). (2) Welsh shell-trumpet used as a dinner summons (small *Strombus gigas*). (3) Miner's blasting signal horn, used in the Guernsey granite quarries (*Strombus gigas*). (4) Conch trumpet, blown at funerals and religious festivals in Southern India (*Turbinella rapa*—peeled and decorated with lotus flower). (5) Triton shell flute from New Guinea (*Triton tritonis*). (6) Helmet shell trumpet from New Guinea (*Cassis cornuta*). (7) Figure-ornamented triton trumpet from Japan. (8) Triton shell flute from Solomon Islands. The exhibitor expressed the opinion that shells were the first forms of trumpets and flutes ever employed.

Sketches of clouds, by Luke Howard, F.R.S., were exhibited by his granddaughter, Lady Fry. These sketches were lately found, unmounted, amongst the family papers of the late Luke Howard. In many cases they bear his initials, or remarks in his handwriting. They appear to have been drawn by him from instances which came under his own observation, during the time that he was conducting those studies which resulted in his work on "The Modifications of Clouds," and in his well-known nomenclature and classification. Some of them were copied for, and appeared in, his work. See also the "Einleitung" to Prof. G. Hellmann's recent reprint of Howard's work. (Berlin: A. Asher and Co., 1894.)

Original drawings of the "Milky Way," made at Birr Castle Observatory, were exhibited by Lord Rosse. These drawings, comprising one general view and three sections of same on an enlarged scale, represent the "Milky Way," as seen with the unassisted eye as far as 20° South Declination. They were reproduced by lithography on half the original scale by Mr. W. H. Wesley and published by Messrs. Longmans.

The Postmaster-General exhibited (1) Wheatstone's automatic transmitter, running up to 600 words per minute, driven by Willmot's air motor. The air motor in this instrument dispenses with the 42 lb. weight which, when the instrument is running at 600 words per minute, requires rewinding by the operator every few seconds. And since the motor is applied directly to the eccentric axle it dispenses with the whole of the train of wheel-work, the friction regulator and complicated fly-wheel. The speed of the instrument is regulated by opening or contracting the nozzle regulating the supply of air. The power required is so small that the instrument can be driven at a moderate speed by simply blowing into it with the mouth. (2) Prof. Hughes' type printing telegraph, driven by Willmot's air motor. The air motor in this instrument takes the place of the 132 lb. weight previously used, and dispenses with the whole of the winding gear, and nearly all the train of wheel-work, the motor being applied directly to the printing shaft. The motor is self-starting in any position, and will run continuously without any aid from the operator.

Messrs. John I. Thornycroft and Co. had on view a case containing models of torpedo boats, light-draft patrol steamer, and the "Thornycroft" water-tube boiler.

A sonometer for measuring the relative and comparative perception of hearing was exhibited by Mr. T. P. Hawksley. The instrument consists of two primary coils of unequal winding; between them slides a secondary coil, two dry cells, or a thermopile supply current, which is made intermittent by an adjustable rheotome. The secondary coil is connected to a deep note telephone, from which proceeds a tube to be applied to the ear. A condenser may be used. At one point on the scale the interruptions of the rheotome are not heard in the telephone, but on approaching the secondary coil to one of the primary coils, the interruptions gradually increase in loudness until they become unbearable to the ear.

Mr. J. Wimshurst exhibited models showing an improved method of communication between shore stations and light-ships, or other like purposes. The method consists in arranging suitably wound coils of insulated wire upon the swivel pin of the moorings, the one coil being in communication with the shore station and the second coil in communication with the ship. Signals, or sound, are transmitted by induction, or by electromagnetic induction.

Mr. Charles Bradbury's exhibit was the "Brunsviga" calculating machine, for plain figures or decimals. The "Brunsviga" is an arithmometer constructed on an entirely new system, and will add, multiply, subtract or divide with absolute accuracy, giving products up to 13 figures (ordinary size) or 18 figures (large size). The handle is turned in one direction for addition or multiplication, and in the reverse direction for subtraction or division. This machine is used at the Royal College of Science, the City and Guilds Technical College, the Millard Laboratory at Oxford, the Postal Telegraphs Department, &c.

Mr. Charles Baker showed apparatus for obtaining instantaneous photo-micrographs, and viewing the image until exposure is made. The apparatus consists of a case containing a metal shutter, carrying a prism, and connected with a pneumatic release. When this shutter is set the image in the microscope is projected, by means of a prism, on to a screen, which is fixed in an adjustable tube at right angles to the optic axis, and can be viewed and focussed up to the moment of exposure. To ensure accurate focus, the screen in the adjusting tube should be placed the same distance from the microscope as the plane of the sensitised plate. A slit in the shutter can be opened or closed to regulate the exposure.

The exhibit of the Marine Biological Association included: (1) Living pelagic larvæ, &c., from Plymouth. (2) Examples of the echinoderm fauna of Plymouth. (3) Hybrid between brill and turbot (North Sea). (4) Sole with an eye on each side of the body. The usual distortion, due to the shifting of the left eye to the right side, had not occurred (North Sea). (5) Plaice larvæ, up to 28 days' old, reared from eggs hatched in the Plymouth Laboratory. The organisms exhibited were either of economic or of scientific interest.

A method of heating by electricity for hospital purposes was shown by Mr. C. T. Snedekor. By means of this electrical mode of generating heat it is possible to obtain and maintain uniform any required degree of temperature. The apparatus is enclosed in an elastic and flexible case, with a silk or woollen covering, so that it can be applied to and envelope any part of the body as a fomentation. It can also be used for a domestic Turkish bath, or used as a footwarmer, and generally for warming purposes in the bedroom or carriage.

Prof. Oliver Lodge, F.R.S., exhibited a compact and sensitive detector for electric radiation, and a spherical radiator of short Hertz waves. The apparatus consisted of a small copper cylinder containing a piece of zinc and sponge, forming a battery,

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a coil and suspended needle-mirror, forming a galvanometer, and a ball contact or "coherer," or else a tube of filings, in circuit with the other two. Electric surgings in the air, or in a scrap of wire pegged into the lid, increased the conductance of the circuit. A light tap on the cylinder reduced it again. A handy lamp and scale enabled the deflexion of the needle to be seen. The surgings could be excited by giving sparks to an insulated sphere not far off, especially if the knobs supplying the sparks are well polished.

The exhibit of Dr. E. C. Stirling, C.M.G., F.R.S., was a series of fourteen photographs, with two maps and a geological section illustrating the researches carried on at Lake Callabonna, in South Australia, for remains of Diprotodon and other extinct animals, in 1893. A description of the work to which these photographs refer is given in another part of this number.

Gold leaf made by electro-deposition was exhibited by Mr. J. W. Swan, F.R.S. This exhibit illustrated an attempt to produce gold leaf by electro-chemical instead of mechanical means. The leaves were prepared by depositing a thin film of gold on a highly polished and extremely thin electro copper deposit. The copper was then dissolved by perchloride of iron, leaving the gold in a very attenuated condition. The leaves were approximately four millionths of an inch thick, and some of them mounted on glass showed the transparency of gold very perfectly when a lighted lamp was looked at through them.

Miss Edna Walter and Mr. H. B. Bourne had on view a projective goniometer. By means of this instrument, devised and constructed by the exhibitors, the projection of a crystal on a sphere is actually accomplished, realising in practice the fundamental assumption of the theory of crystallography; the instrument is thus of value in demonstrating the axioms of the science. If necessary, angular measurements could be made from the image, but these only attain an accuracy of about 40′ in 60° = one per cent., which is inferior to that attained with a goniometer.

Lord Kelvin showed a model illustrating the molecular tactics of a quartz crystal. The crystalline molecule was represented by a regular hexagonal prism of wood, the long diagonal of the hexagon being ·95 of the length of the prism. This gave in the assemblage representing a quartz crystal of regular form, the correct angle (38° 13′) between the faces of the prism and the faces of the terminal six-sided pyramid. Each crystalline molecule was marked on alternate sides with slips of blue and red paper, to show the orientational difference between the alternate sides of the prism and the absolute difference between the alternate faces of the pyramid. The coloured slips were placed obliquely to give the chiral quality of the crystalline molecule and of the assemblage. Right-handed and left-handed molecules were shown. All the piezo-electric and pyro-electric properties of the crystal (including the chiral piezo-electric property discovered by Voigt) would be actually produced in the model, if copper and zinc were substituted for the red and blue paper, and the individual prisms separated by elastic insulating material. The model showed the well-known orientational macling on two faces of the prisms, and the contiguous pair of faces of the terminal pyramid.

Dr. Isaac Roberts, F.R.S., showed original negatives and enlarged photographs of the spiral nebulæ Messier 74 Piscium, Messier 101 Ursæ Majoris, Messier 65 and 66 Leonis, Herschel I. 168 Ursæ Majoris, Herschel I. 56 and 57 Leonis. These photographs revealed the forms and structures of the spiral nebulæ with much greater detail and accuracy than had previously been known. They also clearly showed that the spirals were almost perfect geometrical figures, but broken up into numerous stars, or star-like condensations of the nebulosity, or of the meteoric matter, of which they are probably composed, and thus furnish strong evidence of the truth of the nebular or of the meteoric hypotheses.

A number of specimens illustrating locomotion phases in decapod crustacea were exhibited by Prof. Stewart, who also showed mummy cloth, of not later than 4000 B.C., compared with finest Irish linen of to-day. The piece of mummy cloth, made not later than 6000 years ago (IVth Egyptian Dynasty), was shown by the side of a piece of finest Irish linen 140 × 140 of to-day. The strands of the mummy cloth were 300 × 150 per inch.

Specimens of metallic chromium, manganese, tungsten iron, &c., free from carbon, also fused alumina, obtained during reduction of the metallic samples, were exhibited by Mr. Claude Vautin. The specimens of metallic chromium, manganese, &c., had been reduced from their oxides by means of metallic aluminium. The oxide of the metal to be reduced was intimately mixed with finely divided aluminium, and heated in magnesia-lined crucibles. The heat produced by the oxidation of aluminium during the operation was sufficient to fuse alumina, specimen of which was exhibited.

Prof. A. M. Worthington, F.R.S., and Mr. R. S. Cole exhibited photographs of a splashing drop. The photographs shown were obtained by allowing a drop to fall in absolute darkness, and illuminating it at any desired stage of its splash by a suitably timed Leyden jar discharge taking place between magnesium terminals. The exhibit comprised (1) shadow photographs obtained when a drop of mercury fell on the sensitive plate itself, which was laid horizontally and illuminated from above; (2) objective photographs, showing much more detail than has usually been obtained in such instantaneous work, and illustrating the exquisite sensitiveness of the very rapid modern plates. To obtain these photographs the spark was produced at the focus of a deep, silvered watch glass subtending an angle of nearly 180°, and was brought very near to the place of impact. A single quartz spectacle lens was substituted for the usual lens of the camera, and thus the absorption of photographic rays by glass was avoided.

Mr. W. Kurtz (New York) exhibited photographic prints in the natural colours, obtained by printing in the three primary colours only (Dr. Vögel's process). The prints shown were all of them printed in *three* colours only, some by surface-printing, the others by lithography; but in all cases the printing blocks were produced by photography. The process employed is as follows:—By the intervention of suitable media, three photographs are obtained, severally appropriate to the three primary colours composing the original picture or view required to be reproduced. From these three photographs, respectively due to the chemical action of the red, yellow, and blue rays of the spectrum, printing blocks are prepared, which being printed from in red, yellow, and blue ink, give the multi-coloured effects shown by the specimens.

Prof. Elisha Gray exhibited the telautograph, an instrument for transmitting intelligence by electricity. The writer at one station using a lead-pencil, attached mechanically to the apparatus, and writing upon ordinary paper, transmits to the distant station a facsimile of his handwriting, at his ordinary writing speed. Sketches, sketch-portraits, diagrams, plans, trade-marks, and the like, as well as the characters of hieroglyphic alphabets may also be transmitted.

The following exhibits, with demonstrations by means of the electric lantern, took place in the meeting room of the Society:—

The magic mirror, by Mr. J. W. Kearton. It was shown that the English magic mirror owes its peculiar properties to curved elevations and depressions in the polished metallic face, the elevations producing figures in shade by scattering of light, and the depressions, figures in light by condensing rays reflected from the mirror on to a screen. The figures in relief and intaglio are first produced by the action of any suitable acid on the metal plate, and are then polished down until they disappear to direct vision. The figures of the Japanese type of mirror are by-products in the process of manufacture, and arise from local yieldings of the face and back during polishing: the more rigid parts of the face, which correspond to raised metallic figures on the back, suffer a somewhat greater reduction from opposing greater resistance to the polishing tool.

As at the previous conversazione, Prof. E. B. Poulton gave illustrations of recent work upon the influence of environment upon the colours of certain lepidopterous larvæ.

Mr. D. Morris, C.M.G., exhibited and described a series of views illustrating the leading features of tropical vegetation.

A CHEMICAL METHOD OF ISOLATING FLUORINE.

A NEW salt of exceptional interest, the first member of a series of fluorplumbates, is described by Dr. Brauner, of Prague, in the June issue of the *Journal* of the Chemical Society. Dr. Brauner is well known in this country, having been Berkeley Fellow of the Owens College, Manchester, previous to his appointment to the chair of chemistry in the Bohemian University. Twelve years ago he described two compounds very rich in fluorine, $CeF_4 . H_2O$ and $3KF . 2CeF_4 . 2H_2O$, and showed that when heated they first gave up their water and subsequently evolved a gas which possessed an odour similar to that of hypochlorous acid, and which exhibited the

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